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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/957,461	09/21/2001	Yoshio Machida	2382-21	2595
23117	7590	07/26/2005		
NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203			EXAMINER SULLIVAN, JULIANNE M	
			ART UNIT 3737	PAPER NUMBER

DATE MAILED: 07/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/957,461

Applicant(s)

MACHIDA, YOSHIO

Examiner

Julianne M. Sullivan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 April 2005.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 April 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4/5/02.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The following typographical errors were noted in the disclosure: in line 8 of the paragraph beginning at page 2, line 28, "the convention MR," and in line 11 of the same paragraph, "ot perform." Appropriate correction is suggested.
2. The following typographical error was noted in the claims: in Claim 19, "wherein the exciting includes...." Suggested alternatives are "wherein the step of exciting includes..." or "wherein exciting the object includes...." Appropriate correction is suggested.

Response to Arguments

3. Applicant's arguments with respect to Claims 1-19 have been considered but are moot in view of the new ground(s) of rejection.
4. With respect to Applicant's arguments regarding the rejection of Claims 1-5, 8 and 13-18 as anticipated by Margosian et al. (U.S. Patent No. 5,423,315), the Examiner has introduced a new reference, Seo et al. (U.S. Patent No. 5,378,986), to meet the limitations added to the Claims.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-5, 8, 13-17 and 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Margosian et al. (U.S. Patent No. 5,423,315) in view of Seo et al. (U.S. Patent No. 5,378,986).

Margosian et al. teaches a magnetic resonance imaging system and method including exciting means for selectively exciting in turn a plurality of regions of an object, the plurality of regions being located within a predetermined imaging range that is provided by the magnetic resonance imaging system and may be spatially fixed and composed of multi-slices of the object, acquiring means for acquiring echo data from the plurality of regions while the object is continuously moved, processing means for producing image data from the echo data acquired by the exciting means, where the exciting means includes position-moving means for moving spatial positions of the plurality of excited regions synchronously with the movement of the object, where the position-moving means includes a couch with a tabletop on which the object is laid and is configured to change slice by slice the carrier frequency of the selective-excitation RF pulse to be applied to the multi-slices, the couch having a mechanism for moving the tabletop in a longitudinal direction of the tabletop, where the slice-selective axis of the multi-slices agrees with the moving direction of the object and where the scanning means uses a pulse sequence based on a fast spin echo technique, including a gradient that meets, at least partly, a VIPS condition (col. 1, line 69, col. 2, lines 1-17 and 39-43, col. 4, lines 56-60, col. 5, lines 21-26 and 30-37, col. 6, lines 47-51, col. 8, lines 6-9, col. 12, lines 14-39, col. 13, lines 6-15 and 35-41 and "C" in Fig. 1).

Margosian et al. does not explicitly teach that the system includes a first region being excited at intervals a plurality of time while in the predetermined imaging range such that at least

one other region is also excited during a period between said intervals. In the same field of endeavor, Seo et al. teaches an interleaved slice excitation pattern of this type (col. 5, lines 22-65 and Fig. 6). It would have been obvious to one of ordinary skill in the art at the time of the invention to have used an interleaved multi-slice method with the system and method of Margosian et al. in order to reduce the overall scan time of the imaging process (see for motivation Seo et al. at col. 1, lines 57-63).

7. Claims 6, 9, 18 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Margosian et al. in view of Seo et al. as applied to Claims 1, 14 and 20 above, and further in view of Kuhn et al. (U.S. Patent No. 5,636,636).

Margosian et al. in view of Seo et al. discloses all of the features of the present invention except for expressly describing an MRI system where the slice-selective axis of the multi-slices is different from the moving direction of the object and the corresponding configuration of the position-moving means to change slice by slice the carrier frequency of the selective-excitation RF pulse to be applied to the multi-slices in compliance with the geometrical relationship between the moving direction of the object and the slice selecting direction.

In the same field of endeavor, Kuhn et al. expressly teaches a magnetic resonance system wherein an object is moved continuously through the imaging range and the slice-selective axis is different from the moving direction of the object (col. 6, lines 34-36). Kuhn et al. further teaches that the carrier frequency of the selective-excitation RF pulse must be changed in compliance with the geometrical relationship between the moving direction of the object and the slice selecting direction (col. 6, lines 36-40). It would have been obvious to one skilled in the art at the time the invention was made to have modified Margosian et al. to incorporate the

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teachings of Kuhn et al. to produce magnetic resonance images using a slice-selection axis different from the moving direction of the object based on the reference to such oblique slices in Margosian et al. (col. 6, lines 4-9) in order to provide more useful images of structures within an object.

8. Claims 7, 10, 19 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Margosian et al. in view of Seo et al. as applied to Claims 1, 14 and 20 above, and further in view of Hajnal (U.S. Patent No. 6,385,478).

Regarding Claims 7, 19 and 25, Margosian et al. in view of Seo et al. discloses all of the features of the present invention except for providing that the scanning means of the MRI system includes means for adding another slice to the tail of a group of multi-slices as a slice at the head of the group of multi-slices in the moving direction goes out of the imaging range. However, in the same field of endeavor, Hajnal expressly discloses an MRI system and method where an additional slice is added to the end of the imaged volume as successive slices at the front of the volume move out of the imaging range (col. 5, lines 62-67 and col. 6, lines 1-5). It would have been obvious to one skilled in the art at the time that the invention was made to have modified Margosian et al. to incorporate the teachings of Hajnal as a practical means of extending the imaging volume once the initial slices had passed through the imaging range, in order to image a volume of indefinite length, as referenced in Margosian et al. (col. 3, lines 10-11).

Regarding Claim 10, Margosian et al. discloses the invention essentially as claimed except for a processing means including phase correcting means for correcting the phase of echo data acquired by the acquisition means on the basis of the geometrical relationship between the position of the object and the direction in which a gradient is applied, and reconstructing means

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for reconstructing the echo data of which phases are corrected by the phase correcting means. Hajnal expressly discloses a processing means including a phase correcting means for correcting the phase of echo data on the basis of the geometrical relationship between the position of the object and the direction in which a gradient is applied (col. 2, lines 36-38 and col. 5, lines 35-44), and a reconstructing means for transforming the data samples corrected by the correcting means into an image (col. 8, lines 64-67). It would have been obvious to one of ordinary skill in the art at the time that the invention was made to have modified Margosian et al. to incorporate the teachings of Hajnal in order to improve image quality when the moving direction of the object is different from the slice-selective axis (see for motivation to combine Hajnal, col. 2, lines 33-39).

9. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Margosian et al. in view of Seo et al. as applied to Claim 1 above, and further in view of Pipe (U.S. Patent No. 5,327,088).

Margosian et al. in view of Seo et al. discloses all of the features of the present invention except for use of a preparation pulse. In the same field of endeavor, Pipe teaches a magnetic resonance imaging technique including the use of a preparation pulse for reducing motion artifacts (col. 3, lines 9-13 and Fig. 10). It would have been obvious to one skilled in the art at the time that the invention was made to have modified Margosian et al. to incorporate the teachings of Pipe to use a preparatory pulse in order to reduce the motion artifacts that result from the continuous movement of the object through the imaging range, as discussed in Margosian et al. (col. 5, lines 1-3), and thereby improve the quality of the images produced.

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10. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Margosian et al. in view of Seo et al. as applied to Claim 1 above, and further in view of Miyamoto (U.S. Patent No. 6,483,305).

Margosian et al. in view of Seo et al. discloses all of the features of the present invention except for use of a pulse sequence having a gradient pulse applied in the moving direction of the object, in which a phase compensation pulse for nulling a gradient moment of a first or second order is added to at least part of the gradient pulse. In the same field of endeavor, Miyamoto does teach the use of a gradient where a phase compensation pulse for gradient moment nulling is applied (col. 5, lines 3-9). It would have been obvious to one skilled in the art at the time that the invention was made to have modified Margosian et al. to include the teachings of Miyamoto in order to improve image quality by eliminating phase variation induced by motion of the object (see for motivation to combine Miyamoto, col. 5, lines 10-13).

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julianne M. Sullivan whose telephone number is 571-272-6084.

The examiner can normally be reached on Monday through Friday 8:00am to 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Casler can be reached on 571-272-4956. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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